PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in and relating to Shaft Couplings

I, STANLEY MORTON, a Citizen of Canada, of 3370, West 43rd Avenue, in the City of Vancouver, in the Province of British Columbia, Canada, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in shaft couplings.

An object of the present invention is the provision of a shaft coupling which releases when overloaded and returns to and remains in its normal position when normal load conditions are restored.

Another object is the provision of a shaft coupling which gives under overload without damage to its structure.

Another object is the provision of a shaft coupling which will allow for any reasonable misalignment of the shafts being coupled.

Yet another object is the provision of a shaft coupling which reduces the transference of vibration from one shaft to the other.

A further object is the provision of a device of the nature described which reduces the transference of noise from one shaft to the other.

The above and other objects are achieved by a shaft coupling comprising driving and driven elements having adjacent substantially concentric surfaces, a plurality of spaced recesses formed in one surface, a sleeve connected to the other surface and completely spaced from the recessed surface, and a plurality of spaced wide projections extending from the sleeve across the space between the latter and the opposite element surface and normally fitting snugly into the recesses, said projections being formed of relatively stiff deformable material capable of bending out of the recesses into the space when one of the elements is subjected to an overload. For example, one of these elements may be a drum mounted in and concentric with an annular flange which constitutes the other element. A deformable member formed of a suitable material such as rubber, rubber composition, or rubber and fabric composition, may be fitted on and/or bonded to one of the elements, in this example, on the outer surface of the drum. This member is formed with a plurality of projections adapted removably to fit into corresponding recesses formed in the inner surface of the flange. These projections are sufficiently stiff to remain in the recesses under normal load conditions. However, should an overload be applied to one or both of the shafts, these projections will bend and slip out of the recesses thus allowing the elements to rotate in relation to each other. When normal load conditions are restored, the elements will move in relation to each other only until the projections fit back into the recesses, thus locking the elements together.

Examples of this invention are illustrated in the accompanying drawings, in which:—

Figure 1 is a vertical section through one form of shaft coupling.

Figure 2 is a fragmentary enlarged section taken on the line 2—2 of Figure 1 with the coupling under normal load conditions.

Figure 3 is a view similar to Figure 2 of the coupling when under overload conditions.

Figure 4 is a variation of the form of the invention shown in Figure 2.

Figure 1 illustrates one type of shaft coupling embodying this invention. The coupling is made in two parts to be connected to the shafts 10 and 11 which are to be connected together. One part of the coupling is formed with a plate 15 having a hub 16 projecting outwardly therefrom into which the end of the shaft 10 is fixedly secured. An annular flange 17 projects outwardly from this plate and has an inner bearing surface 18.

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The other part of the coupling consists of a drum 20 which is adapted to fit inside the flange 17, said drum having an outer bearing surface 21 which is spaced from and concentric with the inner surface 18 of the flange. This drum is provided with an outwardly-projecting hub 22 in which the shaft 11 is fixedly secured.

The flange 17 and drum 20 constitute the driving and driven elements of this coupling. In this example, the drum will be considered the driving element.

A member 25 formed of suitable deformable material, such as rubber, rubber composition, or rubber and fabric composition, is mounted between the elements 17 and 20. The member 25 is in the form of a sleeve which is pressed on and/or bonded to the surface 21 of the drum. This member is provided with a plurality of radial projections 26 which extend outwardly therefrom and fit into correspondingly-shaped shallow recesses 27 formed in the surface 18 of the annular flange 17. While the outer ends of these projections and the recesses are shown as being rectangular in shape, it is to be understood that they may be curved.

Figure 2 shows the above-described coupling under normal load conditions. When the drum 20 is rotated, this movement is transferred through the member 25 and its projections 26 to the flange 17. The projections are stiff enough to make a driving connection between the two elements under normal conditions. However, if an overload is placed on either of the shafts 10 or 11 the projections 26 will be deformed and bend to permit one element to move in relation to the other, as shown in Figure 3. As long as the overload condition remains, one element will turn in relation to the other, but when normal conditions are restored, this movement will continue only until the projections snap into the recesses 27, at which time the elements will turn together.

The coupling shown in Figure 4 is very similar to that shown in Figure 2, the only difference being that the member 25 is bonded to the inner surface 18 of the flange 17, and its projections 26 extend inwardly and fit into correspondingly-shaped recesses 29 formed in the outer surface 21 of the drum 20. This coupling functions in the same manner as the one described above.

It will be noted that in each form of this invention, the part forming the connection between the driving and driven elements is formed of a deformable material. Normally these elements are frictionally retained from rotating with respect to each other. Under overload, the deformable material gives sufficiently to permit relative rotation. The deformability of this material allows for any reasonable amount of misalignment of the shafts, and it reduces the transference of vibration or noise from one shaft to the other. When a shaft is subject to overload, the coupling will slip without being damaged by this action and it is not necessary to take it apart to return it to its normal operating conditions.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A shaft coupling comprising driving and driven elements having adjacent substantially concentric surfaces, a plurality of spaced recesses formed in one surface, a sleeve connected to the other surface and completely spaced from the recessed surface, and a plurality of spaced wide projections extending from the sleeve across the space between the latter and the opposite element surface and normally fitting snugly into the recesses, said projections being formed of relatively stiff deformable material capable of bending out of the recesses into the space when one of the elements is subjected to an overload.

2. A shaft coupling as claimed in Claim 1 in which the recesses are substantially rectangular in cross section and the projections correspond in shape to said recesses.

3. A shaft coupling as claimed in Claims 1 or 2 in which the recesses are relatively shallow.

4. A shaft coupling as claimed in any of the preceding claims in which the sleeve is formed of the same material as and is integral with the projections.

5. A shaft coupling as claimed in any of the preceding claims in which the recesses are formed in the outer element surface, the sleeve is connected to the inner element surface, and the projections radiate outwardly from the sleeve.

6. A shaft coupling as claimed in Claims 1 to 4 in which the recesses are formed in the inner element surface, the sleeve is connected to the outer element surface, and the projections extend inwardly from the sleeve.

7. A shaft coupling substantially as described with reference to the accompanying drawings.

Dated this 14th day of November, 1949.
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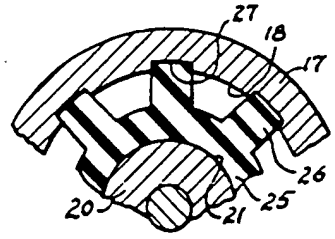

Fig.2.

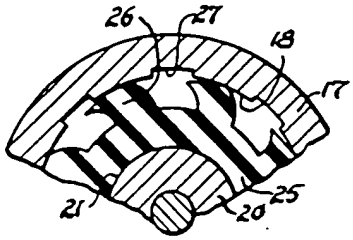

Fig.3.

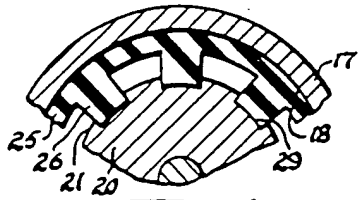

Fig.4.

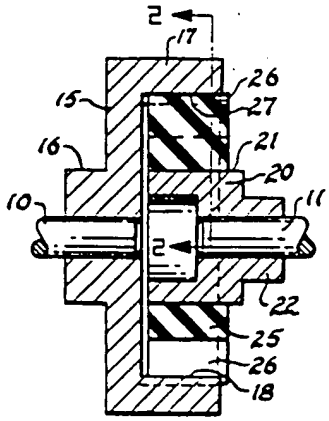

Fig.1.

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